

Wednesday Afternoon, May 14, 2025

Awards Ceremony and Honorary Lecture

Room Town & Country A - Session HL-WeHL

Bunshah Award Honorary Lecture

6:05pm HL-WeHL-2 R.F. Bunshah Award and ICMCTF Lecture Invited Talk:
Life with Optical Coatings and ICMCTF: from Design to Manufacture, and the Multifunctional, Multisectoral and Holistic Approaches, Ludvik Martinu¹, Polytechnique Montréal, Canada **INVITED**

Optical coatings (OC) represent a fascinating area of study and applications which focuses on the interaction of light with matter: One can rigorously design the optical performance of optical filters and optical devices based on the knowledge of the optical constants to obtain appropriate optical transmission, reflection, color and related effects. In practice, however, successful fabrication and performance of the optical filters depend on the control of coatings' microstructure, which closely depends on the fabrication conditions and the detailed effect of specific processes on the film growth.

In my presentation, I will discuss the progress in the field of OC while highlighting both encouraging successes but also ongoing challenges. The latter ones include issues related to manufacturability, as well as tribo-mechanical and environmental durability in frequently harsh environments. Additionally, I will review developments in OC, such as energetic plasma- and ion-surface interactions and their effect on the interfaces, prospects of inhomogeneous (graded) OC, process monitoring based on time-, space- and specie-resolved diagnostics, nanostructured OC including plasmonic effects and porous media, dynamic OC (e.g., electrochromic and thermochromic), and the increasingly important multifunctional characteristics.

Throughout this presentation, I will highlight the significance of collaboration between academic and industrial laboratories, as well as the broader multisectoral implications that arise from such partnerships. In addition, I will emphasize the importance of adopting a global (holistic) approach when developing appropriate surface engineering solutions. These points will be further illustrated through several stories from my involvement in the ICMCTF over the past few decades.

¹ R.F. Bunshah Awardee

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